

Factors affecting clinical outcomes in adult patients with cochlear implants

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Retrospective data from 2251 cochlear implant (CI) recipients implanted between 2003 and 2011 at 15 centres were analysed to identify factors affecting speech perception in quiet. The usual factors (cochlear implant experience, duration of severe-to-profound hearing loss (s/pHL), age at onset of s/pHL, age at implantation, and etiology) had a significant effect. The effects of these factors were compared with their effects in an earlier study that used similar methods (Blamey *et al.*, 1996). The negative effect of long duration of s/pHL was less important in the new data than in 1996; the effects of age at CI and age at onset of s/pHL were delayed until older ages; etiology had a smaller effect; and the effect of CI experience was greater with a steeper learning curve. Relaxed patient selection criteria, improved clinical management of HL, modifications of surgical practice, and improved devices may explain the differences.

The additional significant factors in the newer data were: the pre-operative pure tone average threshold of the better ear, the brand of device, the percentage of active electrodes, the use of hearing aids (HAs) during the period of s/pHL, and the duration of moderate hearing loss (mHL). Many of these factors are associated with plastic effects in the auditory system – leading to slow degeneration during periods of reduced auditory input, and partial post-operative recovery of auditory function when auditory input is restored with a CI.

A new model was designed showing a decrease of performance that started during the period of mHL, and accelerated during the period of s/pHL. The use of bilateral HAs had a protective effect. The use of HAs from the very beginning of hearing impairment slowed down the related central reorganization.

Blamey P, Arndt P, Bergeron F, Bredberg G, Brimacombe J, Facer G, Larky J, Lindström B, Nedzelski J, Peterson A, Shipp D, Staller S, Whitford L. (1996) Factors affecting auditory performance of postlinguistically deaf adults using cochlear implants. *Audiology & Neuro-otology* **1**: 293-306.